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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,526	06/30/2000	Shuo DI	MSI-449US	1121

			EXAMINER
22801	7590	08/16/2004	STEVENS, THOMAS H

LEE & HAYES PLLC
421 W RIVERSIDE AVENUE SUITE 500
SPOKANE, WA 99201

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)	
Office Action Summary	09/608,526	DI ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on <u>03 May 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-4 and 9-28</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-4 and 9-28</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>03 June 2000</u> is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-4 and 6-28 were reviewed. Section 1: Response to arguments; section 2:

rejections.

Section 1 Response to Arguments

Abstract

2.   The applicants are thanked for rewriting the abstract; objection is withdrawn.

Drawings

3.   The applicants are thanked for addressing this issue. The examiner apologizes

for not explaining why figures 1,4 and 5 should be labeled as prior art. Figures 1 and 4

are ubiquitous electronic devices and thus should be labeled as prior art. Objection to

figures 1 and 4 stands; but the objection to figure 5 is withdrawn.

Preambles

4.   The applicants are thanked for addressing this issue. Objection is withdrawn.

Amended Claims

5.   The examiner acknowledges the cancellation of claim 5.

35 U.S.C. § 112, Second Paragraph

6.   The applicants are thanked for addressing this issue. The examiner has

acknowledged the change to claim 2, which reflects, claim 4, thus rejection to claim 4 is

withdrawn. Rejections to claims 25,27-28 are withdrawn based on amendments to

claims.

35 U.S.C. § 101

7.   The applicants are thanked for addressing this issue, specifically the issue of the

claims to recite post-solution activity; however there are other issues outstanding.

Claims 11-16 and 17-22 are reciting abstract mathematical concepts with no definitive

solution (i.e., "predicting a likelihood..."). Thus, the rejection stands.

35 U.S.C. § 102(b)

8.   Applicant's arguments, filed 05/03/2004, with respect to the rejections of claims

1-28 under 35 U.S.C. § 102(b) have been fully considered and are persuasive.

Therefore, the rejection has been withdrawn. However, upon further consideration, a

new ground(s) of rejection is made in view of Marquez.

Section II Rejections

Claim Rejections - 35 USC § 112

9.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter, which the applicant regards as his invention.

10.   Claims 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as it is not

clear which claim they now depend upon. Based on this, the examiner interprets 6 and

7 are dependent from claim 1.

Claim Rejections - 35 USC § 101

11.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12.   Claims 11-16 and 17-22 are rejected under 35 U.S.C. 101 because the claimed invention is reciting abstract mathematical algorithm with no definitive solution (i.e., "predicting a likelihood..."). The examiner respectfully submits that the applicants have not claimed a practical application. An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The examiner respectfully submits, under current PTO practice, that the claimed invention does not recite a tangible or concrete result.

Claim Rejections - 35 USC § 102

13.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14.   Claims 1-4,9-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Marquez ("Statistical Learning" (1999)). Marquez teaches a statistical learning process to identify data structures (Note: Examiner interprets all arithmetic computations of this magnitude are completed on computer medium with standard memory).

Claim 1: A method comprising: assigning each of a plurality of segments comprising a received corpus to a node in a data structure denoting dependencies between nodes (slide 24); calculating a transitional probability between each of the nodes in the data structure (slide 25); and managing storage (slide 27; note: mathematics of this magnitude require a computer; thus inherent) of the data structure across a system memory of a computer system and an external memory of the computer system.

Claim 2: A method according to claim 1 (slides 24 and 35), further comprising: calculating a frequency of occurrence (slide 2, bullets 1 and 2) for each elemental item of the segment; and removing nodes of the data structure associated with items which do not meet a minimum frequency threshold for the frequency of occurrence (slide 24).

Claim 3: A method according to claim 2 (slides 24, 35) wherein the frequency of the item is calculated by counting item occurrences throughout the subset and/or corpus.

Claim 4: A method according to claim 2, wherein the minimum threshold is three (slide 24).

Claim 9: A method according to claim 1, wherein calculating a transition probability includes calculating a Markov transitional probability between nodes (slide 24).

Claim 10: A storage medium comprising a plurality of executable instructions including at least a subset of which that, when executed by a processor, implement a method according to claim 1(slides 24 and 35).

Claim 11: A method for predicting a likelihood of an item in a corpus comprised of a plurality of items, the method comprising (slide 12, bullet 1): building a data structure of corpus segments representing a dynamic context of item dependencies within the segments (slide 14); calculating the likelihood of each item based, at least in part, on a likelihood of preceding items within the dynamic context (slide 14 and 18); iteratively re-segmenting the corpus (slide 14 and 18); and predicting a likelihood of an item in the re-segmented corpus (slide 14 and 18).

Claim 12: A method according to claim 11, wherein the method of building a dynamic context of preceding dependent items comprises (slide 14 and 18): analyzing the data structure representing the language model (slides 2 and 20); identifying all items with dependencies to or from the item (slides 20 and 21); and a using all items with dependencies to or from the item as the dynamic context

Claim 13: A method according to claim 11(slides 2 and 20), wherein the language model includes frequency (slide 2, bullets 1 and 2) information for each item within the model.

Claim 14: A method according to claim 13 (slides 2, bullets 1 and 2; and slide 20), wherein calculating the likelihood of the item comprises: calculating a Markov transition probability for the item based, at least in part, on the frequency of the items comprising the dynamic context (slides 24, 25 and 26 bullets 2 and 3).

Claim 15: A method according to claim 11(slides 2, 20,21), wherein calculating the likelihood of the item comprises: calculating a Markov transition probability for the item given the dynamic context of items (slides 24, 25 and 26 bullets 2 and 3).

Claim 16: A storage medium having stored thereon a plurality of executable instructions including instructions which, when executed by a host computer implement a method according to claim 11(slides 2 and 20).

Claim 17: A data structure, generated by a computer system as a statistical language model (slide 2, bullet 2), the data structure comprising: one or more root nodes (slide 7a and 7b); and a plurality of subordinate nodes, ultimately linked to a root node, cumulatively comprising one or more sub-trees (slide 36), wherein each node of a to sub-tree represents one or more items of a corpus and includes a measure of a Markov transition (slide 24) probability between the node and another linked node.

Claim 18: A data structure according to claim 17(slide 2, bullet 2; and slide 7a and 7b), wherein the root node represents a common root item for all subordinate nodes in the one or more sub-trees (slide 14, last bullet).

Claim19: A data structure according to claim 17(slide 2, bullet 2; and slide 7a and 7b), wherein the Markov is transition probability is a measure of the likelihood of a transition from one node to another node based, at least in part, on the one or more items represented by each of the nodes (slide 24).

Claim 20: A data structure according to claim 17(slide 2, bullet 2; and slide 7a and 7b), wherein the items include one or more of a character, a letter, a number, and combinations thereof.

Claim 21: A data structure according to claim 17, (slide 2, bullet 2; and slide 7a and 7b) wherein the data structure represents a dynamic order Markov model (DOMM) language model of the textual source.

Claim 22: A storage medium comprising a plurality of executable instructions which, when executed by a processor, implement a data structure according to claim 17(slide 2, bullet 2; slide 7a and 7b).

Claim 23: A memory subsystem in a computer system including one or more of a cache memory, a system memory and extended memory having information stored therein which, when interpreted by a processor of the computer system; represent a data structure according to claim 17 (slide 7a and 7b).

Claim 24: A modeling agent comprising: a controller, to receive a corpus (slide 12, bullet 1); and a data structure generator, responsive to and selectively invoked by the controller, to assign each of a plurality of segments comprising the received corpus to a node in a data structure denoting dependencies between nodes (slides 24 and 29); wherein the modeling agent calculates a transitional probability between each of the nodes of the data structure to determine a predictive capability of a language model represented by the data structure and iteratively re-segments the received corpus until a threshold predictive capability is reached (slides 18 and 24).

Claim 25: A modeling agent according to claim 24(slides 24 and 29), the data structure generator comprising: a dynamic segmentation function (slide 14 and 18), to iteratively re-segment the received corpus to improve language model predictive capability (slides 18 and 24).

Claim 26: A modeling agent according to claim 24(slides 24 and 29), the data structure generator comprising: a frequency analysis function to analyze a frequency of occurrence of segments within the corpus (slides 18 and 24).

Claim 27: A modeling agent according to claim 26(slides 24 and 29), wherein segments that do not meet a frequency of occurrence threshold are removed from the data structure, reducing data structure size and improving language model predictive capability (slide 20)

Claim 28: A storage medium comprising a plurality of executable instructions including

at least a subset of which, when executed, implement a language modeling agent to

assign each of a plurality of segments of a received corpus (slides 18, 20, 24) to a

nodes in a data structure denoting dependencies between nodes, and to calculate a

transitional probability between each of the nodes in the data structure to determine a

predictive capability of a language model denoted by the data structure, wherein the

modeling agent dynamically re-segments the received corpus to remove segments

which do not meet a minimum frequency threshold to improve one or more language

model performance attributes.

Claim 29: A storage medium according to claim 28(slides 18, 20, 24), wherein the one

or more language model performance attributes include a predictive capability.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mr. Tom Stevens whose telephone number is (703) 305-

0365, Monday-Friday (8:00 am- 4:30 pm) or contact Supervisor Mr. Kevin Teska at

(703) 305-9704. The fax number for the group is 703-872-9306.

Any inquires of general nature or relating to the status of this application should

be directed to the Group receptionist whose phone number is (703) 305-3900.

July 30, 2004

THS